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ABSTRACT

Five programs in developmental reading at Leeward Community College (Hawaii) were studied to determine their effectiveness. The programs were: (1) general reading using individualized exercises; (2) an integrated skills approach combining reading and basic English skills; (3) a curriculum designed for each student from diagnostic testing; (4) a program based on social competency or "survival" skills; and (5) peer-tutoring in reading, writing, and computation. Pre/post assessment used the Nelson-Denny Reading Test for achievement, and the Nowicki-Strickland Inventory for affective criteria. A post-test achievement comparison between groups, course completion rates, "subsequent educational plans", and comparative data on personnel costs were also analyzed. Statistical findings included in the document supported the following recommendations: (1) that primary emphasis should go to students with at least a high school reading ability; (2) that an integrated skills approach for differential reading gains is not supported; (3) that survival skills are best attained by learning to read generic matter well; and (4) that students with reading ability below the high school level might best be served in secondary school programs. The document contains complete program descriptions and detailed analyses of all factors considered. (RT)

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# Leeward Community College: Developmental Education Study

October, 1977

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JC 770 448

This study was conducted by the LCC Office of Institutional Research. Valuable assistance in the area of test administration was provided by the Office of Psychometry. The cooperation of the various program staff members is also acknowledged and appreciated.

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## Introduction

When Leeward Community College opened its doors in 1968, there was the presumption that the entering student body would generally conform to the general population in the area of abilities, skills, and motivational patterns. This has largely proved the case. However, it soon became obvious that a large portion of the general student population served by the college had substantial academic deficiencies in the area of basic skills on entry. While a good number of our new students are highly prepared for a college experience, a large number of students do not have skills in such basic areas as reading and writing that are necessary to undertake college work successfully. In order to better serve our diverse student body, it was decided to initiate a program of placement testing and to provide remedial courses in such areas as reading, writing, and arithmetic. It was also decided to provide special counseling to those students who had serious learning problems and/or motivational patterns which do not predispose them to academic success.

During the academic year 1975-76, approximately one-third of the students tested proved to have language arts abilities which are considered to be inadequate to successfully complete college courses requiring a good deal of reading. This criterion level has been identified by the school Pyschometrist as a reading level of less than 10th grade. According to the LCC Office of Psychometry, data taken in previous years indicates that writing proficiency tends to be highly correlated with reading proficiency.

In the academic year 1976-77 there was a substantial drop in ability of students who applied for admission. In the spring of 1977 only 54% of the new students could read at the 10th grade level or better.

In order to guarantee some modicum of success for the 46% of our entering students who could not read at the 10th grade level, various kinds of remedial programs in language arts have been provided. On the Leeward campus at present there are at least three discernibly different prescribed programs of remedial reading. These courses are described as being "developmental" in order to avoid the negative connotation associated with the term "remedial." The college also operates a development program in its off-campus centers at Waianae-Nanakuli. One other non-college-associated, experimental program in language arts instruction exists for students in the Leeward/Central area. This is an experimental University of Texas originated program.

Because of the considerable concern regarding the effectiveness of developmental education, and the problems faced by teachers and students involved in such programs, it was decided to study the four programs operated by the college. The non-college program also generously agreed to provide data whereby we might gain additional perspectives on our campus-operated programs.

The study was conducted during the spring semester of 1977.

## Design

The study was extremely exploratory in nature. Two preliminary types of inferential analysis were undertaken. The first involved a pre/post assessment to determine if any linear growth had taken place. A "t" test for correlated data was used to measure gains within groups. No statistical comparisons between groups were employed in this part of the analysis. The two instruments that were used to plot growth were the Nelson-Denny Reading Test, for the achievement criterion, and the Nowicki-Strickland Inventory for the affective criterion.

The second part of the analysis attempted a partial comparison between the posttest performance of each of the various groups. In doing this, an attempt was made to adjust for any initial differences in ability between the students enrolling in the various programs. Because students could not be randomly assigned to each of the 5 programs, an analysis of covariance was used. The covariant employed consisted of the pretest aggregate score on the Nelson-Denny Reading Test. Basically, the researcher wanted to know how much growth, if any, occurred in each group which could be attributed to the program prescribed.

Course completion and an "indication of subsequent educational plans" were also compared between groups. However, no inferential analysis was attempted relative to these criteria.

To determine if the two achievement instruments were really measuring different things, "academic" versus "functional" literacy, a correlational analysis was conducted. And finally, comparative data on personnel costs were gathered and summarized.

## Instrumentation

### Nelson-Denny Reading Test

This instrument has been used by the Office of Psychometry since the college began its program of placement testing. Several forms are available and all have been used. However, the form used in this particular study was form "D."

The test is designed to measure "vocabulary," "comprehension," and "reading rate." Little utility has been demonstrated in using the "reading rate" component and so the college has placed primary emphasis on the first two components. The sum of these components is used as the aggregate or total score.

The complete test requires 30 minutes of testing time. Ten minutes are needed for the vocabulary section, and 20 minutes for the comprehension component. Time limits are strictly observed to insure the validity of the administration. It is a multiple choice test which allows the use of answer sheets which the student can score himself. However, all score sheets are rechecked for accuracy.

### Nowicki-Strickland Opinion Survey

This survey instrument is designed to monitor one socialization criterion. It measures "internal-external" predispositions for motivation. Persons who look to peers or media for cues as to how to behave or perform are said to be motivated "externally" or "other-directed." According to many theorists, they tend to be more fatalistic, accept failure more readily and are not generally self-starters. The "internal" or "inner-directed" man is more confident in his own ability to overcome problems and adversity and is generally a self-starter. It is hypothesized that internally-directed

people are likely to have a higher propensity to learn. One of the goals of all programs herein studied was to improve the internal motivation of students.

The survey is comprised of 40 items or statements. The respondent either reacts affirmatively or negatively to the item. The purpose of the survey is not inherently obvious and was not made known to the participants until after the posttesting was completed.

Adult Performance Level Test (APL)

The APL test is one product of the Adult Performance Level Program which was developed by the University of Texas. This four-year project was funded by the U.S. Office of Education. The research and development team did a national needs assessment which showed that 20 percent of American adults, some 23 million people, are unable to apply the skills they need to handle daily tasks. An individual may be able to decode the sentence "We are an Equal Opportunity Employer" but be unable to comprehend its meaning.

The test is of the paper and pencil variety, as are the others, and has no time limit. The test items are scored in two different ways. One method of scoring produces results organized around skills areas. They are as follows:

Identifying Facts and Terms

Reading

Writing

Computation

Problem Solving

Using the alternate scoring method, the individual's competency in the following content areas is measured:

Community Relations

Occupational Knowledge

Consumer Economics

Health

Government and Law

As opposed to the Nelson-Denny reading test, which some educators claim measures "academic literacy," this instrument is designed to measure "functional literacy." According to the specialists involved in the development of the test "...functional competency is a dynamic process, not a static state. It depends upon an indivual's ability to meet the demands that society makes at a given time." This test is designed to assess this type of basic functional literacy.

## Description of Programs Studied

### Regular Leeward Developmental Program: English 001

a. Target Group

The original intent of this program, as identified in 1969, was to provide all students with a program to improve his or her reading and study skills. While this still remains the objective, the large number of students who score below the 10th grade level on the diagnostic tests administered on entry to school has come to constitute a special target group. The program of diagnostic testing was begun in 1970. Data gathered from this program of testing conducted each semester revealed that about one-third of the entering student body did not read at a level necessary to do regular college work. As previously mentioned, this target group requiring remediation grew to 46.6% during the spring of 1977.

b. Curriculum

The basic curriculum was developed by Cary Odom. The course evolved over several years and was modified as the results of formative evaluation. The system is dynamic with modifications in the instructional program being tried each semester. Information about successes and failures is shared by all staff members. The courses are still individualistic enough to accommodate each instructor's personality traits and teaching strengths. However, all English 001 programs have certain things in common. These common ingredients include standard goals, objectives, and a high congruence in course outlines.

The learning theory employed rests heavily on behaviorist concepts. The basic approach involves the prescription of work in small segments and sequences with frequent checks and rewards. A high premium is placed on continuous interaction with the student.

c. Sequence of Learning

Students are usually referred to the course as part of the placement testing. In most instances, additional diagnostic testing is done when the student enters the program.

Students are then provided with individual assignments consistent with their apparent entry-level abilities. Various types of materials are used. Some of these are workbooks specifically designed for adults. Among those used are Reading Faster and Understanding More, Study Skills for Students of English as a Second Language, and Learning the College Lingo. The latter text was developed by a Leeward Community College instructor, Pat Dunn-Rankin, and is designed specifically with these students in mind. Also employed are commercially produced materials from such firms as Science Research Associates, and Barnell-Loft.

When a student completes a given set of prescribed exercises, he or she reviews the progress made to date with the instructor. If the specific learning criteria have not been met, the student is given an alternate assignment which covers the same skills using different materials.

A record of the student's progress is maintained for reference by the student and the instructor. Regular group assignments are also made. Students are encouraged to work together and to provide reinforcement for each other.

Many individual assignments are to be undertaken in the Reading/Writing Laboratory. The lab has instructors on duty to help students individually as they may need it. Some student assistants are also involved.

Work is evaluated for grading purposes using the normal academic semester

cycle. Posttests are conducted at the end of the semester term. Grades are assigned using criteria negotiated with the student. However, all students are expected to obtain a reading proficiency of 10th grade level or better. Those entering with greater proficiency are expected to make gains commensurate with their ability over the duration of the semester. The Language Arts Division Reading Skills Coordinator identified 106 students who were enrolled in only English 001 who would agree to participate in the study.

Leeward Integrated Skills Approach

a. Target Group

During the on-going process of formative evaluation of the English 001 program, some faculty concluded that some students, while successful in improving their reading ability, were not achieving commensurate success in their academic and occupational training courses. Counselors and instructors, working together, found that such students generally were weak in other basic skills and frequently had poor study habits. For one group of veterans, suffering from those difficulties, a special curriculum was developed. This was termed the Veterans-Cost-of-Instruction Program. With the advent of the Advanced Institutional Development Program (AIDP) grant it was decided to try this approach on students revealing uniformly poor basic skills.

b. Curriculum

It is hypothesized that many students for one reason or another have become conditioned to failure. In fact, some learning theorists argue such students fear success. Ineptness in one area frequently becomes generalized to other academic skill areas. A poor reader is likely to feel that he is a poor writer and mathematician as well. His behavior becomes self-validating and his dysfunctional study skills in one

subject are employed to the same result in other academic disciplines. It is argued that the student should not attempt regular college work until he has brought all basic skills up to minimal levels through intensive involvement in an integrated program of basic skills development. It is also felt that this will result in a change in his perception of himself as a learner.

Instead of just taking developmental reading, students having the learning attributes alluded to are counseled into an integrated program of reading and basic language skills. Frequently a developmental math course is prescribed as well. The various instructors work together with the counselors to turn the students around educationally. It is hoped that by combining such complimentary subjects as reading and basic English, that a "value-added" effect will be attained. The student is only exposed to criterion-referenced materials where it is difficult to fail. Few, if any, regular college courses are recommended. These courses are predicated on the assumption that the student is competent in the requisite basic skills on entry. Often the textbooks presume a level of academic literacy far beyond that actually enjoyed by the student. The evaluation of the student's progress in these regular courses is likely to make use of class or institutional norms. Assessment is likely to be scheduled in accordance with the normal academic rhythms with little regard for the student's actual rate of growth or pattern of learning.

The Integrated Skills approach is not fully developed. In fact, the same thing can be said of the other programs described herein. The Integrated Skills approach was not consciously prescribed for a given study population in the semester studied. However, an analysis of the class schedules of students who were enrolled in the basic developmental reading course revealed that there were a substantial number of students

whose schedules were similar to that prescribed in the planned AIDP Integrated Skills Development Program. Students were enrolled in developmental reading and English simultaneously and many were taking developmental math as well.

Students entering developmental course work on campus adhere to the program of attendance characteristic of regular college students. However, they do not complete the course successfully until minimum proficiency levels have been attained even though the semester concludes. Many find it necessary to re-register in the subsequent semester to achieve the criterion benchmarks specified.

Next semester it is planned to modify this approach further. Selected students will be registered for developmental courses and counseled away from taking any regular academic or occupational training until minimum proficiency levels are attained in basic skills.

For the purpose of this study, students who were registered in English 001 and one other language-arts-related course, of a developmental nature, were considered to be in an "integrated program." Frequently the students so identified were also enrolled in a developmental math course as well. The number of students originally identified for inclusion in this group was 114.

Waianae-Nanakuli Education Center Program

a. Target Group

Some students in this program are self-referrals, however, there are other students who have been referred by various agencies (Family Court, District Court, CETA, public assistance programs, and public high school).

The process of involving a student in the program is as follows:

An appointment is made with the coordinator who then administers a diagnostic test, TESOL Adult Basic Education Test (TABE). If they score 6th grade or above, they are assigned a comprehensive curriculum. If they score below the 6th grade, all efforts are directed at the early development of reading skills.

b. Curriculum

Using the scores for diagnostic purposes, the students are assigned an individualized program of instruction. The six instructors, under the direction of the coordinator, begin implementing a curriculum tailored for the student using program materials.

Several different learning systems are used. The most frequently employed commercial materials include the Science Research Associates kits, the Laidlaw Brothers Specific Skills materials, the Catching On workbooks and the Trouble Shooter workbooks.

The materials assigned are determined by the instructor after an analysis of the learner needs. For instance, the Trouble Shooter materials and specific SRA kit are used with students who display difficulty with grammatical structures or in situations where inordinately low vocabulary scores are encountered. The students attend one of the two laboratories whenever their personal schedules permit. The laboratories are composed of study carrels, material centers, learning assistance stations, and conference tables. Some individual desks are also provided. This allows a broad range of learning activities to accommodate particular preferences and styles. The teacher acts as a resource person, materials coordinator, and counselor. Regular staff meetings are held to discuss

individual problems of students and instructors. Workshops with educational material vendors and visitations to other educational programs are also held on a recurrent basis.

Students are only given personal assistance when they specifically request it. This assistance is individualized and no directions are employed.

As students arrive at a given benchmark, they consult the instructor to determine if they have achieved the requisite skills and have assimilated the particular knowledge component involved.

If a student is observed to be progressing rapidly, he may be specifically assigned to take a particular test or unit. For instance, if a student client appears to be doing well in the punctuation exercises provided in the Trouble Shooter books, they are offered the opportunity to take the Job Corps Screen Test in the area that encompasses this subject. In addition, a student who progressively does well in the reading comprehension exercises may take the Reading for Understanding placement test, or the SRA Rate Builders. If they score well, they are reassigned to an upgraded curriculum, with gradual direction into the GED program.

Social studies and science are covered in the reading comprehension component of each program effort.

Depending upon where they are in the academic cycle, students who have advanced to the GED program and are progressing well are given the California Achievement Test (CAT). This test serves as a pretest and diagnostic tool which indicates to the staff those areas, if any, in which the student needs additional help.

The learning program is adjusted on the basis of the results. After a two-month period of intensive study in the revised curriculum, students are given an alternate form of the California Achievement Test. A minimum score of 10.0 on each section is necessary in order for the student to be recommended to take the GED exams.

Students are then referred to the DOE adult school to take this test. All students enrolled in the beginning of the spring semester were included in the sample.

Competency Based Program

a. Target Group

The target population covered by the experimental Competency Based Program Department of Education site is varied in composition. A broad range of ages and occupations is represented and there is a broad spectrum of ability evidenced on entry to the program. The students have one thing in common, they are people who have encountered some difficulty in school which has caused them to abort their educational experience prior to completing the requirements for a high school diploma. Many have encountered "math anxiety" and others have serious problems communicating. Most are cognizant of the fact that dropping out of school was a mistake. Many need a high school degree to become employed or to retain their present employment. All of the students in this study group have failed the GED test one or more times.

b. Curriculum

The program is essentially designed to teach the survival skills necessary to function successfully in a complex society. The experimental program being implemented was developed by the University of Texas and was supported by a grant from the USOE. The program is non-traditional and designed to meet the needs of students who have not met with success in traditional school environments.

The approach is predicated on the assumption that people will develop those skills and assimilate that knowledge which they feel is relevant and necessary for the successful conduct of their chosen lifestyle. Learning is directed to a mastery of basic skills and the exercises are derived from everyday life experiences.

The program is organized around five major foci. They are as follows:

1. occupational knowledege: the program seeks to develop a level of knowledge and such basic skills that will enable adults to secure employment in accordance with their individual needs and interests.

2. consumer economics: the program is designed to provide students with the skills necessary to manage a family budget and to demonstrate an awareness of sound purchasing principles.

3. health: the program is designed to insure good mental and physical health for the individual and his family.

4. government and law: the program is organized in such a way as to promote an understanding of society through government and law, and to produce an awareness of governmental functions, agencies and regulations which define individual rights and responsibilities.

5. community resources: the program encourages an understanding that community resources, including transportation systems, are utilized by individuals in society in order to obtain a satisfactory mode of living.

The program has a highly delineated scope and sequence. Specific activities to be undertaken relative to each learning unit are clearly described using scope and sequence charts.

Each of the scope and sequence charts is meant to serve as a map, both for guiding learners through an APL objective and as a guide for further curriculum development. It includes: (1) intermediate objectives for each skill necessary to master an APL objective; (2) enabling objectives necessary for the mastery of each intermediate objective, which are sequenced from entry level to final mastery; and (3) the relationships among the enabling objectives in terms of learning sequence.

An example could be the following:

CR16

Objective: to understand driving regulations, including safety, courtesy, and rules such as having a driver's license, car license plates, etc.

| | Intermediate Objectives |
|---|---|
| Reading | In preparing for a driver's license, the adult learner reads the driver's manual. |
| Writing | The adult learner writes the name, address and telephone number of the driver's licensing agency in his/her community and fills out an application for a driver's license. |
| Speaking<br>Listening<br>Viewing<br>Problem Solving | The adult learner: (a) views and discusses rules and regulations regarding safe driving practice, and (b) gains necessary information for obtaining or renewing a driver's license. |
| Interpersonal Relations | The adult learner determines how he/she would handle traffic incidents. |

The performance criteria were developed by the American Council of Testing.

While the APL program is itself experimental, the Hawaii adaptation also involves a good deal of experimentation. The project staff modified many of the objectives. Some of the original materials tended to refer

to many types of people, similar to those in the study group, in a deprecatory fashion. Those references were deleted or modified.

The project staff adapts the regular materials and is continuously involved in formative evaluation. This formative evaluation is facilitated by the team-teaching approach. One of the members of the team employed in the study period was a trained counselor and the other a linguist. They spent a portion of each learning session reviewing the progress of each pupil and comparing each other's perception of that which occurred in the classroom situation.

Each pupil keeps a cumulative record of their progress. The progression is recorded as each step is attained.

c. Unique Problems

Special problems, due to the nature of the student clientele, were encountered. Several of the younger pupils became involved in personal difficulties which inevitably inpinged upon their classroom performance. As a consequence, the teachers had to become psychologists of a sort.

The program continues to change as the result of the formative evaluation. It is anticipated that it will take as many as two years to assess, adapt, and formalize the system.

Peer-Tutoring, Communication-Oriented Approach to Basic Skills

a. Target Group

The basic target group involves all students who are inadequately prepared to deal with college work. The basic skills emphasized are reading, writing, and computation. All age groups and students with a broad range of learner characteristics are considered to be the potential clients for the program. The program is suitable for both off- and on-campus administration.

No special equipment or special facilites are necessary.

b. Curriculum

The program is predicated on several theories of learning. It includes stimulus-response modes, incorporates Bloom's concept of unit analysis, and rests in part on Carroll's "time sufficiency theory." It also makes use of Mager's criterion-referenced methodology for evaluation and attempts to structure a learning environment that is consistent with Magoroh Maruyama's theories of morphogenetics. The program represents a combination of various ideas and approaches, which are conceptually organized around the Heinberg learning model and is largely behavioristic.

This peer-tutoring, communication-oriented approach involves little or no lecture sessions and is designed to promote high density student participation. Another salient characteristic is the "variable entry and exit option." Students progress at individually appropriate rates and are not punished for failure.

Most students are self-referrals who are responding to advertisements regarding the program. Other students learn of the curriculum from their peers who are presently or were previously enrolled in the program.

Upon entry into the program, the instructor administers math and English simulation GED tests for diagnostic purposes. Depending upon the circumstances, some standardized tests are used. After analyzing the test data, the instructor determines the level at which the student will begin, and counsels the student accordingly. Also, during this orientation session, the student is provided with booklets which serve as roadmaps and detail the sequence of learning to be undertaken, identifies the specific program materials, and the criterion for each exercise. Each unit

is accompanied by criterion-referenced tests. The student may proceed to the next unit only after he has successfully completed the unit which preceeds it.

The program places a heavy emphasis on peer-tutoring through interactive or two-way communication modes. The peer-tutoring is one of the primary reasons that students tend to recruit their friends. The interactive learning system with its high communication component involves "dyadic" and "triadic" learning structures. In dyadic structures, one student tutors another; in triadic structures, one student is the learner, another the tutor, and the third the evaluator. This oral interaction is designed to facilitate and encourage conceptualization and assimilation of factual information.

When the student has completed the units prescribed, various GED simulations are used. Then the CAT test is given. If the student completes the CAT successfully, he or she is given the GED.

All students enrolled in the beginning of the spring 1976 semester participated in the study.

## Analysis and Findings

### Age of Population Studied

The groups were compared using age as a variable. This was to determine if there were any gross differences between groups on this characteristic. Many educators consider this variable of substantial importance in explaining differences in learning styles. For this reason, frequencies by age were computed. These descriptive data are too copious to reproduce here. However, the mean, median, mode, standard deviation, and range are provided in Table 1.

The groups were more alike on this criterion than might have been expected. The mode was either 18 or 19 in each group. The average age ranged from 23 years in the Peer Tutoring Program to 28 at WNEC. The standard deviation and range data suggest that all groups were pluralist with regard to age. It was not considered feasible by the various program staff members to gather data on other demographic characteristics.

### Baseline Test Data

The research staff was interested in determining whether the different groups of students under study were comparable relative to their entry level abilities. All of the programs subscribed to similar goals and objectives. However, it was assumed that there might be differences between the student populations served in terms of language arts skills. This assumption proved to be valid (refer to Tables 2-6). Those enrolled in the Regular Leeward Program and the Waianae-Nanakuli Education Center proved to be the most proficient. The group scoring highest on the baseline measure proved to be from the Waianae-Nanakuli Education Center (refer to Table 7). Those students who took the regular developmental reading program at Leeward scored second highest. Those taking Integrated Skills, that is, two or more developmental education

TABLE 1

COMPARISON OF GROUPS
BY AGE

| Group | Mean | Median | Mode | SD | Range |
|---|---|---|---|---|---|
| Regular Leeward | 24.4 | 20.8 | 18.0 | 8.7 | 41 |
| Integrated Skills | 23.7 | 20.0 | 18.0 | 7.9 | 31 |
| WNEC | 28.7 | 24.2 | 19.0 | 11.0 | 35 |
| Competency Based | 24.8 | 19.0 | 18.0 | 9.8 | 29 |
| Peer Tutoring | 23.2 | 19.1 | 18.0 | 8.7 | 31 |

TABLE 2

NELSON-DENNY READING TEST
PRETEST SCORES FOR
REGULAR LEEWARD DEVELOPMENTAL ED PROGRAM

| Score | Frequency | Adjusted Percentage | Cumulative Percentage |
|---|---|---|---|
| 2 | 1 | 0.9 | 0.9 |
| 12 | 1 | 0.9 | 1.9 |
| 16 | 1 | 0.9 | 2.8 |
| 18 | 2 | 1.9 | 4.7 |
| 19 | 1 | 0.9 | 5.7 |
| 20 | 1 | 0.9 | 6.6 |
| 21 | 1 | 0.9 | 7.5 |
| 22 | 1 | 0.9 | 8.5 |
| 23 | 4 | 3.8 | 12.3 |
| 24 | 1 | 0.9 | 13.2 |
| 25 | 1 | 0.9 | 14.2 |
| 26 | 2 | 1.9 | 16.0 |
| 28 | 2 | 1.9 | 17.9 |
| 29 | 4 | 3.8 | 21.7 |
| 30 | 1 | 0.9 | 22.6 |
| 31 | 1 | 0.9 | 23.6 |
| 33 | 4 | 3.8 | 27.4 |
| 34 | 5 | 4.7 | 32.1 |
| 35 | 1 | 0.9 | 33.0 |
| 36 | 6 | 5.7 | 38.7 |
| 37 | 4 | 3.8 | 42.5 |
| 38 | 3 | 2.8 | 45.3 |
| 39 | 1 | 0.9 | 46.2 |
| 40 | 1 | 0.9 | 47.2 |
| 41 | 2 | 1.9 | 49.1 |
| 42 | 1 | 0.9 | 50.0 |
| 43 | 3 | 2.8 | 52.8 |
| 44 | 3 | 2.8 | 55.7 |
| 45 | 3 | 2.8 | 58.5 |
| 46 | 2 | 1.9 | 60.4 |
| 47 | 1 | 0.9 | 61.3 |
| 48 | 2 | 1.9 | 63.2 |
| 49 | 6 | 5.7 | 68.9 |
| 50 | 2 | 1.9 | 70.8 |
| 51 | 1 | 0.9 | 71.7 |
| 52 | 3 | 2.8 | 74.5 |
| 53 | 4 | 3.8 | 78.3 |
| 54 | 1 | 0.9 | 79.2 |
| 56 | 3 | 2.8 | 82.1 |
| 57 | 5 | 4.7 | 86.8 |
| 58 | 1 | 0.9 | 87.7 |
| 60 | 1 | 0.9 | 88.7 |
| 61 | 2 | 1.9 | 90.6 |
| 62 | 2 | 1.9 | 92.5 |
| 64 | 1 | 0.9 | 93.4 |
| 66 | 2 | 1.9 | 95.3 |
| 69 | 1 | 0.9 | 96.2 |
| 70 | 1 | 0.9 | 97.2 |
| 87 | 1 | 0.9 | 98.1 |
| 89 | 1 | 0.9 | 99.1 |
| 99 | 1 | 0.9 | 100.0 |

N = 106

Mean = 42.6 Mode = 36
Median = 42.5 Standard Deviation = 16.1

TABLE 3

NELSON-DENNY READING TEST
PRETEST SCORES FOR
INTEGRATED SKILLS PROGRAM

| Score | Frequency | Adjusted Percentage | Cumulative Percentage |
|---|---|---|---|
| 6 | 1 | 0.9 | 0.9 |
| 12 | 1 | 0.9 | 1.8 |
| 15 | 1 | 0.9 | 2.6 |
| 17 | 2 | 1.8 | 4.4 |
| 18 | 2 | 1.8 | 6.1 |
| 19 | 2 | 1.8 | 7.9 |
| 20 | 2 | 1.8 | 9.6 |
| 22 | 3 | 2.6 | 12.3 |
| 23 | 3 | 2.6 | 14.9 |
| 24 | 1 | 0.9 | 15.8 |
| 25 | 5 | 4.4 | 20.2 |
| 26 | 3 | 2.6 | 22.8 |
| 27 | 3 | 2.6 | 25.4 |
| 28 | 1 | 0.9 | 26.3 |
| 29 | 2 | 1.8 | 28.1 |
| 30 | 2 | 1.8 | 29.8 |
| 31 | 4 | 3.5 | 33.3 |
| 32 | 1 | 0.9 | 34.2 |
| 33 | 2 | 1.8 | 36.0 |
| 34 | 1 | 0.9 | 36.8 |
| 35 | 11 | 9.6 | 46.5 |
| 36 | 1 | 0.9 | 47.4 |
| 37 | 5 | 4.4 | 51.8 |
| 38 | 5 | 4.4 | 56.1 |
| 39 | 3 | 2.6 | 58.8 |
| 40 | 4 | 3.5 | 62.3 |
| 42 | 3 | 2.6 | 64.9 |
| 43 | 5 | 4.4 | 69.3 |
| 44 | 4 | 3.5 | 72.8 |
| 46 | 1 | 0.9 | 73.7 |
| 47 | 4 | 3.5 | 77.2 |
| 48 | 6 | 5.3 | 82.5 |
| 49 | 4 | 3.5 | 86.0 |
| 50 | 3 | 2.6 | 88.6 |
| 51 | 2 | 1.8 | 90.4 |
| 52 | 2 | 1.8 | 92.1 |
| 53 | 1 | 0.9 | 93.0 |
| 54 | 1 | 0.9 | 93.9 |
| 55 | 2 | 1.8 | 95.6 |
| 56 | 1 | 0.9 | 96.5 |
| 57 | 1 | 0.9 | 97.4 |
| 59 | 1 | 0.9 | 98.2 |
| 63 | 1 | 0.9 | 99.1 |
| 79 | 1 | 0.9 | 100.0 |

N = 114

Mean = 37.0 Mode = 35

Median = 37.1 Standard Deviation = 12.2

TABLE 4

NELSON-DENNY READING TEST
PRETEST SCORES FOR
WNEC PROGRAM

| Score | Frequency | Adjusted Percentage | Cumulative Percentage |
|---|---|---|---|
| 13 | 1 | 5.9 | 5.9 |
| 14 | 1 | 5.9 | 11.8 |
| 21 | 1 | 5.9 | 17.6 |
| 22 | 1 | 5.9 | 23.5 |
| 31 | 1 | 5.9 | 29.4 |
| 32 | 1 | 5.9 | 35.3 |
| 34 | 2 | 11.8 | 47.1 |
| 43 | 1 | 5.9 | 52.9 |
| 44 | 1 | 5.9 | 58.8 |
| 49 | 1 | 5.9 | 64.7 |
| 50 | 1 | 5.9 | 70.6 |
| 52 | 1 | 5.9 | 76.5 |
| 78 | 1 | 5.9 | 82.4 |
| 81 | 2 | 11.8 | 94.1 |
| 99 | 1 | 5.9 | 100.0 |

N = 17

Mean = 45.8
Median = 43.0
Mode = 34
Standard Deviation = 25.5

TABLE 5

NELSON-DENNY READING TEST
PRETEST SCORES FOR
COMPETENCY BASED PROGRAM

| Score | Frequency | Adjusted Percentage | Cumulative Percentage |
|---|---|---|---|
| 15 | 1 | 6.7 | 6.7 |
| 16 | 1 | 6.7 | 13.3 |
| 20 | 1 | 6.7 | 20.0 |
| 26 | 1 | 6.7 | 26.7 |
| 27 | 1 | 6.7 | 33.3 |
| 29 | 1 | 6.7 | 40.0 |
| 30 | 2 | 13.3 | 53.3 |
| 31 | 1 | 6.7 | 60.0 |
| 32 | 1 | 6.7 | 66.7 |
| 34 | 2 | 13.3 | 80.0 |
| 41 | 1 | 6.7 | 86.7 |
| 42 | 1 | 6.7 | 93.3 |
| 49 | 1 | 6.7 | 100.0 |

N = 15

Mean = 30.4 Mode = 30
Median = 30.2 Standard Deviation = 9.3

TABLE 6

NELSON-DENNY READING TEST
PRETEST SCORES FOR
PEER-TUTORING PROGRAM

| Score | Frequency | Adjusted Percentage | Cumulative Percentage |
|---|---|---|---|
| 8 | 1 | 5.0 | 5.0 |
| 10 | 1 | 5.0 | 10.0 |
| 17 | 2 | 10.0 | 20.0 |
| 18 | 2 | 10.0 | 30.0 |
| 20 | 1 | 5.0 | 35.0 |
| 25 | 1 | 5.0 | 40.0 |
| 26 | 1 | 5.0 | 45.0 |
| 28 | 1 | 5.0 | 50.0 |
| 31 | 1 | 5.0 | 55.0 |
| 34 | 1 | 5.0 | 60.0 |
| 35 | 4 | 20.0 | 80.0 |
| 36 | 1 | 5.0 | 85.0 |
| 41 | 1 | 5.0 | 90.0 |
| 61 | 1 | 5.0 | 95.0 |
| 68 | 1 | 5.0 | 100.0 |

N = 20

Mean = 29.9
Median = 28.5
Mode = 35
Standard Deviation = 15.1

TABLE 7

COMPARISON OF PARTICIPATING PROGRAMS
RELATIVE TO
NELSON-DENNY PRETEST TOTAL

| Program | N | Mean | Median | Mode | Standard Deviation |
|---|---|---|---|---|---|
| Regular Leeward | 106 | 42.613 | 42.500 | 36 | 16.085 |
| Integrated Skills | 114 | 37.026 | 37.100 | 35 | 12.160 |
| WNEC | 17 | 45.765 | 43.000 | 34 | 25.469 |
| Competency Based | 15 | 30.400 | 30.250 | 30 | 9.287 |
| Peer Tutoring | 20 | 29.900 | 28.500 | 35 | 15.103 |

TABLE 8

COMPARISON OF PARTICIPATING PROGRAMS
RELATIVE TO
NELSON-DENNY POSTTEST TOTAL

| Program | N | Mean | Median | Mode | Standard Deviation |
|---|---|---|---|---|---|
| Regular Leeward | 74 | 58.459 | 57.500 | 46 | 18.152 |
| Integrated Skills | 77 | 46.506 | 44.875 | 30 | 15.044 |
| WNEC | 17 | 48.941 | 45.000 | 40 | 24.573 |
| Competency Based | 5 | 31.400 | 30.750 | 30 | 4.450 |
| Peer Tutoring | 5 | 34.000 | 30.000 | 17 | 18.908 |

courses on campus, had the third highest rating in terms of their mean and median. The fourth highest group, and that which was the most homogenous, was the group enrolled in the Competency Based Program. Those evidencing the lowest ability levels in the area of language arts were found to be in the Peer-Tutoring Program.

Performance Test Data: Overall Impression

The greatest growth in language arts competency within any given group occurred among those students enrolled in the Regular Leeward Program (refer to Table 8).

For most readers the number of participants to complete any of the programs appears low. The attrition in all programs is cause for substantial concern. Unfortunately, it must be reported for the study population as a whole that the least able students dropped out or remained slow learners.

The posttest data using the Nelson-Denny reading test indicate a somewhat varied pattern. Students enrolled in Leeward who took only the developmental reading course had the highest mean and median scores on the posttest using this academic literacy instrument. Those in the WNEC also made reasonable gains but their relative positions, given the primary evaluation criterion, shifted to second. At the end of the year, those in the Integrated Skills Program ranked third. Those in the Peer-Tutoring and Competency Based Programs scored about the same.

The greatest variance in ability within a group was to be found in the Waianae-Nanakuli Program. Here the standard deviation was 25.4 at the outset and only declined to 24.5 at the posttest.

As previously mentioned, two kinds of analyses were run on the linear data gathered using the Nelson-Denny measure of academic literacy. The first involved a "t" test for correlated data. This statistic attempts to determine

if any apparent difference in the pre and posttest scores is due to chance or should be attributed to the intervention variable. The other basic mode of analysis involved covariance. Covariance allows us to make some adjustment for the demonstrated abilities of the program participants at the outset of a program and make appropriate allowances in an interpretation of the post-test results. The baseline score on the Nelson-Denny pretest was used as a covarient in interpreting the posttest results using that instrument and the APL.

In all programs the average score on the posttest Nelson-Denny was higher than the pretest. However, the particular statistic employed in this assessment of linear growth requires that the data be correlated. Any missing case results in a reduction in the number of degrees of freedom which can be used in interpreting the result. In some programs, the lack of correlated data made it difficult to identify statistical significance. As previously mentioned, the large number of non-completers in each of the programs proved one of the most disappointing findings of the study. A large number of students in these comparatively expensive programs did not complete the assigned course of study despite the fact that the professionals in each project site went to unusual lengths to induce them to remain, continue, and complete their largely individualized programs of study.

The APL test did not tend to discriminate among groups on the posttest.

Performance Test Data: Individual Results

In the basic pre and post analysis the following individual program results were recorded.

For the Regular Leeward Program, statistically significant gains were charted for the course completers in the "vocabulary," "comprehension," and "aggregate

test totals" on the Nelson-Denny test (refer to Tables 9-11). The average pretest score was 44.5. Using national norms, this represents a grade level equivalency of about 9.5. Their posttest was an average of 58.1 which works out to a grade level equivalency of about 11.9. These students were close to a 12th grade reading equivalency and probably capable of doing most community college work where a good deal of reading is involved.

Those taking two or more developmental courses in the Integrated Skills approach made significant gains in vocabulary (refer to Table 12). On the average, they were able to meaningfully identify about six more words at semester's end than they could at the outset. However, there was no significant growth in the area of comprehension (refer to Table 13). There was significant growth in language arts as measured by the test as a whole (refer to Table 14). The students entered the program reading at about the 8th grade level and left it reading above the 9th grade level.

The small number of students enrolled in the WNEC Program made it difficult to draw any inference from the analysis. However, the means and standard deviations are portrayed in Tables 15-17. They entered reading at about the 9th year, 7th month, and finished reading at about the 10th grade level, 3rd month.

The Competency Based group entered the program evidencing more problems of a personal nature and less adequate reading levels than those students in most programs on the Leeward campus or WNEC.

Those who were still regularly attending this open-entry two-year program showed gains in their scores. However, the small number of participants made it generally difficult to draw inferences of a definitive sort.

TABLE 9

MEANS, STANDARD DEVIATIONS, AND "t" VALUE FOR STUDENTS ENROLLED IN THE REGULAR LEEWARD DEVELOPMENTAL EDUCATION PROGRAM ON THE NELSON-DENNY VOCABULARY TEST

| Pretest | Posttest |
|---|---|
| N = 72 | |
| $\bar{x}$ = 18.79 | $\bar{x}$ = 28.01 |
| S = 11.09 | S = 12.77 |
| DF = 71 | |
| "t" VALUE = 10.79 | |

TABLE 10

MEANS, STANDARD DEVIATIONS, AND "t" VALUE FOR STUDENTS ENROLLED IN THE REGULAR LEEWARD DEVELOPMENTAL EDUCATION PROGRAM ON THE NELSON-DENNY COMPREHENSION TEST

| Pretest | Posttest |
|---|---|
| N = 71 | |
| $\bar{x}$ = 26.34 | $\bar{x}$ = 31.25 |
| S = 10.04 | S = 10.70 |
| DF = 70 | |
| "t" VALUE = 3.61 | |

TABLE 11

MEANS, STANDARD DEVIATIONS, AND "t" VALUE FOR STUDENTS ENROLLED IN THE REGULAR LEEWARD DEVELOPMENTAL EDUCATION PROGRAM ON THE NELSON-DENNY READING TEST

| Pretest | Posttest |
|---|---|
| N = 71 | |
| $\bar{x}$ = 44.54 | $\bar{x}$ = 58.18 |
| S = 16.60 | S = 18.05 |
| DF = 70 | |
| "t" VALUE = 7.57 | |

Note: All underscored values are significant at the 0.05 level.

TABLE 12

MEANS, STANDARD DEVIATIONS, AND "t" VALUE FOR STUDENTS ENROLLED IN THE INTEGRATED SKILLS PROGRAM ON THE NELSON-DENNY VOCABULARY TEST

| Pretest | Posttest |
|---|---|
| N = 76 | |
| $\bar{x}$ = 15.86 | $\bar{x}$ = 22.13 |
| S = 6.71 | S = 9.15 |
| DF = 75 | |
| "t" VALUE = 7.55 | |

TABLE 13

MEANS, STANDARD DEVIATIONS, AND "t" VALUE FOR STUDENTS ENROLLED IN THE INTEGRATED SKILLS PROGRAM ON THE NELSON-DENNY COMPREHENSION TEST

| Pretest | Posttest |
|---|---|
| N = 76 | |
| $\bar{x}$ = 22.50 | $\bar{x}$ = 24.67 |
| S = 7.84 | S = 10.10 |
| DF = 75 | |
| "t" VALUE = 1.64 | |

TABLE 14

MEANS, STANDARD DEVIATIONS, AND "t" VALUE FOR STUDENTS ENROLLED IN THE INTEGRATED SKILLS PROGRAM ON THE NELSON-DENNY READING TEST

| Pretest | Posttest |
|---|---|
| N = 76 | |
| $\bar{x}$ = 38.58 | $\bar{x}$ = 46.32 |
| S = 11.86 | S = 15.05 |
| DF = 75 | |
| "t" VALUE = 4.72 | |

Note: All underscored values are significant at the 0.05 level.

TABLE 15

MEANS, STANDARD DEVIATIONS, AND "t" VALUE FOR STUDENTS ENROLLED IN THE WNEC PROGRAM ON THE NELSON-DENNY VOCABULARY TEST

| Pretest | Posttest |
|---|---|
| N = 17 | |
| $\bar{x}$ = 22.65 | $\bar{x}$ = 24.06 |
| S = 20.12 | S = 17.75 |
| DF = 16 | |
| "t" VALUE = 1.01 | |

TABLE 16

MEANS, STANDARD DEVIATIONS, AND "t" VALUE FOR STUDENTS ENROLLED IN THE WNEC PROGRAM ON THE NELSON-DENNY COMPREHENSION TEST

| Pretest | Posttest |
|---|---|
| N = 17 | |
| $\bar{x}$ = 25.76 | $\bar{x}$ = 29.06 |
| S = 14.19 | S = 14.49 |
| DF = 16 | |
| "t" VALUE = 1.97 | |

TABLE 17

MEANS, STANDARD DEVIATIONS, AND "t" VALUE FOR STUDENTS ENROLLED IN THE WNEC PROGRAM ON THE NELSON-DENNY READING TEST

| Pretest | Posttest |
|---|---|
| N = 17 | |
| $\bar{x}$ = 45.76 | $\bar{x}$ = 48.94 |
| S = 25.47 | S = 24.57 |
| DF = 16 | |
| "t" VALUE = 1.03 | |

Note: All underscored values are significant at the 0.05 level.

Nevertheless, significant gains were recorded in the area of vocabulary despite the very few degrees of freedom available to interpret the results. Those who entered the program in February were reading at about the 6th grade level. At the end of the semester, they had increased their reading skills by about a grade level (refer to Tables 18-20). At the end of the study period they were reading at a level that would be commensurate with the third month of the 7th grade.

The other program which intentionally attracted students with the lowest skill levels was the on-campus Peer-Tutoring Program. The retention rate was not high here despite the strenuous efforts of the project staff. However, the students who did complete the course did record some gains (refer to Tables 21-23). The average score for the students, who were still with the program at the end of the semester, had moved from 33.7 to 34.2. No assessment of the statistical significance could be made due to the low N.

When the baseline data were used as a covariant, differences were observed to be greater between groups than within on all three Nelson-Denny scores (refer to Appendix A). For the vocabulary and total test scores, the F-ratio was significant at better than the 1% level. For the comprehension section, the gain was significant at the .05 level. In every instance the adjusted mean score was higher for the Regular Leeward Program than any other group.

Four program sites administered the APL test as a posttest. Because of program considerations unique to this project the Competency Based Program was unable to posttest using this instrument. Each of the 10 separate subscores was analyzed as was the total test score. The results were disappointing. The variances within the groups were greater than the differences between programs in all instances.

TABLE 18

MEANS, STANDARD DEVIATIONS, AND "t" VALUE FOR STUDENTS ENROLLED IN THE COMPETENCY BASED PROGRAM ON THE NELSON-DENNY VOCABULARY TEST

| Pretest | Posttest |
|---|---|
| N = 5 | |
| $\bar{x}$ = 7.80 | $\bar{x}$ = 10.80 |
| S = 4.21 | S = 4.55 |
| DF = 4 | |
| "t" VALUE = <u>6.71</u> | |

TABLE 19

MEANS, STANDARD DEVIATIONS, AND "t" VALUE FOR STUDENTS ENROLLED IN THE COMPETENCY BASED PROGRAM ON THE NELSON-DENNY COMPREHENSION TEST

| Pretest | Posttest |
|---|---|
| N = 5 | |
| $\bar{x}$ = 20.40 | $\bar{x}$ = 21.20 |
| S = 7.67 | S = 4.60 |
| DF = 4 | |
| "t" VALUE = 0.20 | |

TABLE 20

MEANS, STANDARD DEVIATIONS, AND "t" VALUE FOR STUDENTS ENROLLED IN THE COMPETENCY BASED PROGRAM ON THE NELSON-DENNY READING TEST

| Pretest | Posttest |
|---|---|
| N = 5 | |
| $\bar{x}$ = 28.20 | $\bar{x}$ = 31.40 |
| S = 9.73 | S = 4.45 |
| DF = 4 | |
| "t" VALUE = <u>0.83</u> | |

Note: All underscored values are significant at the 0.05 level.

TABLE 21

MEANS, STANDARD DEVIATIONS, AND "t" VALUE FOR STUDENTS ENROLLED IN THE PEER-TUTORING PROGRAM ON THE NELSON-DENNY VOCABULARY TEST

| Pretest | Posttest |
|---|---|
| N = 4 | |
| $\bar{x}$ = 10.25 | $\bar{x}$ = 10.75 |
| S = 10.72 | S = 11.70 |
| DF = 3 | |
| "t" VALUE = 0.42 | |

TABLE 22

MEANS, STANDARD DEVIATIONS, AND "t" VALUE FOR STUDENTS ENROLLED IN THE PEER-TUTORING PROGRAM ON THE NELSON-DENNY COMPREHENSION TEST

| Pretest | Posttest |
|---|---|
| N = 4 | |
| $\bar{x}$ = 23.50 | $\bar{x}$ = 21.00 |
| S = 14.08 | S = 12.38 |
| DF = 3 | |
| "t" VALUE = -0.57 | |

TABLE 23

MEANS, STANDARD DEVIATIONS, AND "t" VALUE FOR STUDENTS ENROLLED IN THE PEER-TUTORING PROGRAM ON THE NELSON-DENNY READING TEST

| Pretest | Posttest |
|---|---|
| N = 4 | |
| $\bar{x}$ = 33.75 | $\bar{x}$ = 34.25 |
| S = 24.53 | S = 21.82 |
| DF = 3 | |
| "t" VALUE = 0.16 | |

Note: All underscored values are significant at the 0.05 level.

In other words, the test did not discriminate between groups. These data are discussed further in the section entitled "Test Analysis" and are also detailed in Appendix A.

Attitudinal Data

The instructors charged with conducting the posttesting had some difficulty getting the Nowicki-Strickland and APL tests administered to their students before the semester ended. The number of students in the Regular Leeward Program who took the posttest on the Nowicki-Strickland dropped to 46 at semester's end.

The students in the Competency Based Program scored the lowest on the base-line testing (refer to Table 27). The average of those completing the course was 18.0 (the lower the score the higher the rating on personal efficacy). This is indicative of the tremendous problems faced by staff attempting to address the learning problems of this particular population. The growth observed could be interpreted to be significant at the 10% level. Significant gains at the .05 alpha level were observed in the Regular Leeward Program and the Integrated Skills Program (refer to Tables 24 and 25).

Course Completion Data

As previously mentioned, the attrition rate in all but one of the programs was high (refer to Table 29).

Course completion was treated conceptually somewhat differently in this study than is the usual practice. This study defined a "course completer" as one whose attendance was sufficiently regular to participate in the post-testing. The student may have still been registered and attending from time to time. This is true even though he did not take the posttest on the

TABLE 24

MEANS, STANDARD DEVIATIONS, AND "t" VALUE FOR STUDENTS ENROLLED IN THE REGULAR LEEWARD DEVELOPMENTAL EDUCATION PROGRAM ON THE NOWICKI-STRICKLAND INVENTORY

| Pretest | Posttest |
|---|---|
| N = 46 | |
| $\bar{x}$ = 12.11 | $\bar{x}$ = 10.30 |
| S = 4.92 | S = 5.50 |
| DF = 45 | |
| "t" VALUE = -2.69 | |

TABLE 25

MEANS, STANDARD DEVIATIONS, AND "t" VALUE FOR STUDENTS ENROLLED IN THE INTEGRATED SKILLS PROGRAM ON THE NOWICKI-STRICKLAND INVENTORY

| Pretest | Posttest |
|---|---|
| N = 63 | |
| $\bar{x}$ = 13.78 | $\bar{x}$ = 12.08 |
| S = 4.76 | S = 5.60 |
| DF = 62 | |
| "t" VALUE = -3.56 | |

TABLE 26

MEANS, STANDARD DEVIATIONS, AND "t" VALUE FOR STUDENTS ENROLLED IN THE WNEC PROGRAM ON THE NOWICKI-STRICKLAND INVENTORY

| Pretest | Posttest |
|---|---|
| N = 16 | |
| $\bar{x}$ = 15.06 | $\bar{x}$ = 15.19 |
| S = 5.48 | S = 3.76 |
| DF = 15 | |
| "t" VALUE = 0.10 | |

Note: All underscored values are significant at the 0.05 level.

TABLE 27

MEANS, STANDARD DEVIATIONS, AND "t" VALUE FOR STUDENTS ENROLLED IN THE COMPETENCY BASED PROGRAM ON THE NOWICKI-STRICKLAND INVENTORY

| Pretest | Posttest |
|---|---|
| N = 5 | |
| $\bar{x}$ = 18.00 | $\bar{x}$ = 16.00 |
| S = 2.45 | S = 4.18 |
| DF = 4 | |
| "t" VALUE = -2.11 | |

TABLE 28

MEANS, STANDARD DEVIATIONS, AND "t" VALUE FOR STUDENTS ENROLLED IN THE PEER-TUTORING PROGRAM ON THE NOWICKI-STRICKLAND INVENTORY

| Pretest | Posttest |
|---|---|
| N = 5 | |
| $\bar{x}$ = 12.20 | $\bar{x}$ = 11.20 |
| S = 5.59 | S = 6.76 |
| DF = 4 | |
| "t" VALUE = -0.51 | |

Note: All underscored values are significant at the 0.05 level.

Nelson-Denny which emerged as the primary achievement criterion. This was particularly true for the Competency Based and Peer-Tutoring programs. However, the strong pre and post emphasis of this particular study predisposed the research staff to use this definition.

Generally, completion rates were associated with the ability demonstrated by the participants on entry into the various study groups. The lower the initial ability of the student, as measured on the Nelson-Denny test, the less likely he or she was to complete the course.

The Regular Leeward Program suffered a 30% attrition and the Leeward Integrated Skills Program endured a 32% loss. The two programs having students with the lowest baseline scores suffered the highest attrition.

The Competency Based Program did not have many people attending regularly to take the posttests, but four of the participants did complete the requirements for the GED.

The lack of any attrition at WNEC is quite remarkable and is probably due to the fact that the coordinator of this progam went to unusual lengths to get students to come in for posttesting. Motivation may also be a factor.

Educational Aspirations of Students

Knowledge of the students' future educational plans varied greatly from one instructor to another. These data are summarized in Table 30 and need little explanation. In general, when the instructor knew of the students' plans, such plans usually involved an intention to pursue further education. At the Competency Based Progam site, instructors reported that all students planned to continue their program, some of them, albeit, at a slower pace.

TABLE 29

PERCENTAGE OF ATTRITION
FROM PRE TO POSTTEST
ADMINISTRATIONS

| Program | Non-Completers N | Non-Completers % |
|---|---|---|
| Regular Leeward | 32 | 30.2 |
| Integrated Skills | 37 | 32.5 |
| WNEC | 0 | 0.0 |
| Competency Based | 10 | 66.7 |
| Peer-Tutoring | 15 | 75.0 |

TABLE 30

INSTRUCTORS' KNOWLEDGE
OF THE STUDENTS'
FUTURE EDUCATIONAL
PLANS

| Program | % that will continue in school | % that will not continue in school | % no knowledge of |
|---|---|---|---|
| Regular Leeward | 33.3 | 3.2 | 63.5 |
| Integrated Skills | 14.4 | 2.7 | 82.9 |
| WNEC | 35.5 | 3.3 | 61.2 |
| Competency Based | 100.0 | .0 | .0 |
| Peer-Tutoring | .0 | .0 | 100.0 |

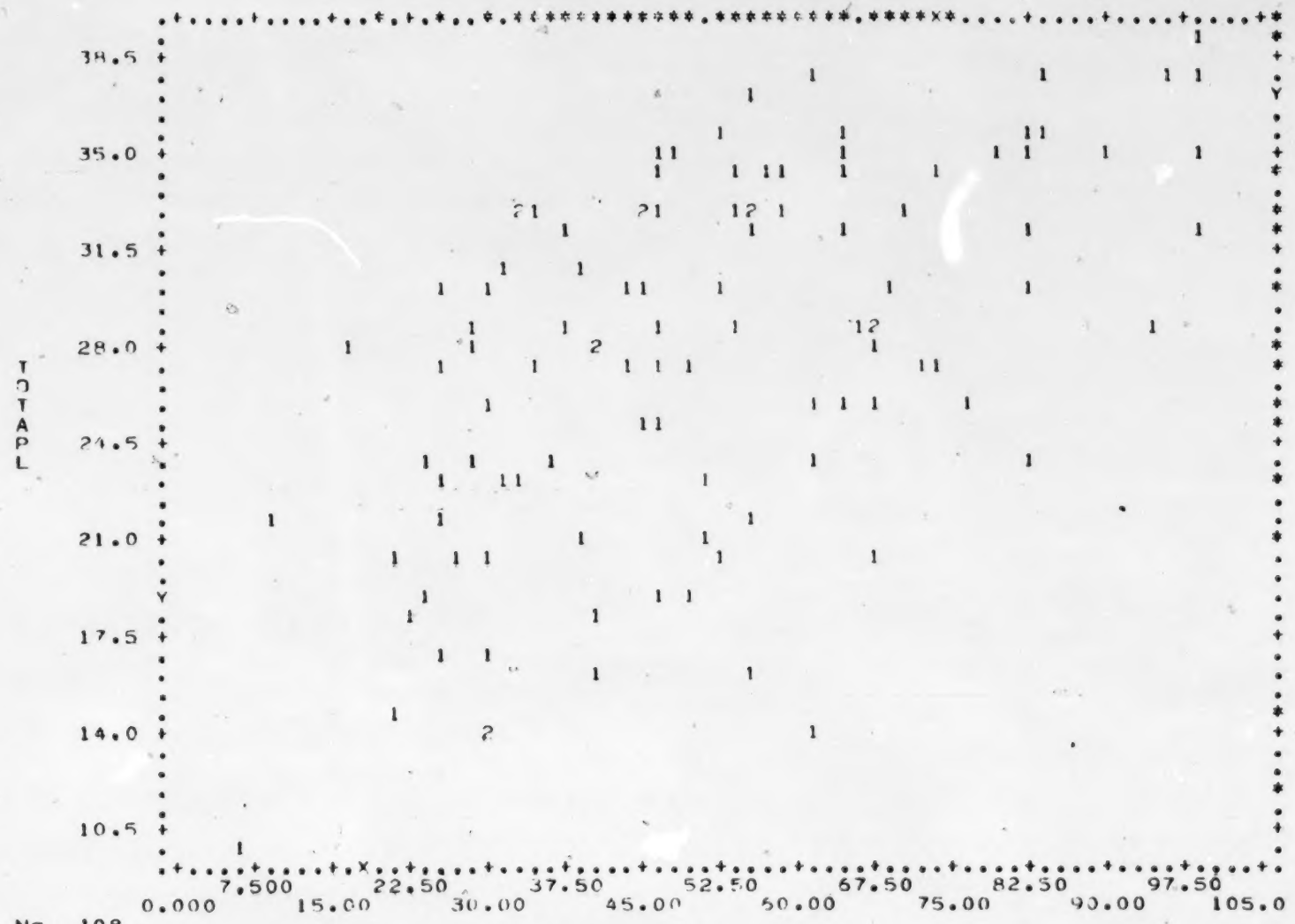
Test Analysis

One of the secondary purposes of the study was to study the ability of the Adult Performance Level (APL) test to discriminate among students. The analysis of covariance generally revealed that the APL instrument was not as effective in discriminating between groups as was the Nelson-Denny. On the APL the probability of any apparent differences in scores between groups on each of the subtests and for the test as a whole had to be attributed to chance. However, on the Nelson-Denny, each of the differences on the subtest scores and for the test as a whole was identified as being significant. In other words, the apparent differences in performance were real.

A Pearson Product Moment Correlation was run between the two sets of scores for each test as a whole. Because of the small N in some programs, the data were aggregated. The correlation coefficient was .544 which is significant (refer to Chart #1). In other words, there appears to be some relationship between how a student did on the Nelson-Denny and his performance on the APL. Very few students who did well on the APL scored poorly on the Nelson-Denny test. These data tend to suggest that functional literacy is not a significantly different concept from academic literacy. In other words, when we teach academic literacy, we're teaching functional literacy as well.

Comparative Cost Data

Some attempt was made to look at the comparative costs entailed in the various programs. However, a precise and comprehensive comparison did not prove feasible. No attempt was made to assign resources which are derived for institutional support areas. Most program people did not feel that any significant "equipment" costs were entailed in the implementation of their particular curriculum. They also were unable to identify "supplies" costs




N= 108
COR= .544

| | MEAN | ST.DEV. | REGRESSION LINE | RES.MS. |
|---|---|---|---|---|
| X | 51.509 | 21.559 | X= 1.7838*Y+ 1.9095 | 330.26 |
| Y | 27.805 | 6.5758 | Y= .16596*X+ 19.257 | 30.727 |

CHART 1

which were unique and that could be directly attributed to the program. In other words, paper which is ordered by a division is used by all staff members and it is difficult to ascertain the volume used by an ENG 001 class as opposed to that used in an ENG 100 class.

All program people concurred that the significant costs were those involving "personnel." Historical budget data in the area of education would tend to bear this contention out. As a consequence, it was considered worthwhile to at least look at whatever comparative cost data that could be obtained for personnel resources.

Actual salary figures for the semester were used. In the case of Leeward, the salary was prorated in terms of the percentage of the class time an instructor devoted to developmental education. The salaries for the two off-campus sites were paid on an hourly basis and were relatively easy to compute.

Two of the Leeward-based programs were assumed to have equivalent costs. The Integrated Skills Program, as defined in this study, required that a student be enrolled in at least one other developmental course. One of these other developmental courses had to be in the area of language arts. Consequently, it was argued that the "cost per pupil" for this program should be at least doubled to accommodate the increased diversion of resources within the Language Arts Division.

The data and methodology are admittedly inexact. However, the data do allow some gross comparison and permit additional perspective. The per pupil costs are reported in terms of students who entered the program as demand was a factor in the number of such courses offered. These data are summarized in Table 31 and are self-explanatory.

TABLE 31

ESTIMATE OF PER PUPIL COSTS
IN TERMS OF "A" FUNDS

| Program | Cost Per Pupil Entering |
|---|---|
| Leeward Regular | $115.57 |
| Integrated Skills | 231.14 |
| WNEC | 188.41 |
| Competency Based | 136.67 |
| Peer-Tutoring | $115.57 |

## Summary and Recommendations

### Background

During the academic year 1976-77, Leeward Community College, the University of Hawaii, and the State Legislature became increasingly concerned by the problem posed by developmental education at Leeward. Test scores indicated that there was an increasing number of students seeking admission without the requisite language arts skills to do college-level work. During the spring, Leeward had four language arts models for developmental education in operation. One was being implemented in the off-campus center maintained by the college. In addition, there was a non-college, experimental program developed by the University of Texas being field tested in the Leeward-Central area. It was decided to monitor the efforts of these five programs to gain greater insights into the processes and patterns of progression involved in different approaches to developmental education. The chief findings are as follows:

### Summary of Findings

a. All programs attract students of varying ages. However, most participants tend to be fairly young.

b. The Leeward off-campus center serves the most varied population.

c. The various programs do attract students with significantly different skill levels. The Competency Based and Peer-Tutoring Programs attracted and were perhaps consciously directed at students having language arts skill proficiency levels which were equivalent to those evidenced by elementary school pupils.

d. The lower the entry level of the student, the less likely he or she was to complete the program or make significant learning gains.

e. Students reading at the high school level or better made the greatest absolute and relative progress.

f. Students in the sample studied who were enrolled in the English 001 program at Leeward made the greatest progress and, based on the criterion provided by the Psychometrist's Office, most were capable of doing college-level work by the end of the semester.

g. There does not appear to be any significant "value added" effect in taking two or more courses in developmental education even though at least one of the additional courses is in language arts.* The integrated skills group did not make significant gains in comprehension. An adjustment was made to statistically compensate for the initial differences in ability between this group and the group in the Regular Leeward Program. However, despite this adjustment, the students enrolled in the Regular Leeward Program still out-performed those in the group taking two or more developmental skills courses on the primary achievement criterion.

h. There does not appear to be much difference in the concepts of academic literacy and functional literacy as measured by the tests employed. Students who did well on the Adult Performance Level (APL) test also tended to do well on the Nelson-Denny Reading Test.

i. The Nelson-Denny test is more effective in discriminating between the progress of students and programs than is the APL.

j. Students in the Regular Leeward Program and the Leeward Integrated Skills Program recorded significant gains in terms of internalized motivation and self-confidence.

*Value added refers to the cumulative effect that is expected to occur when a combination of educational components are combined in some way.

k. Instructors were generally unaware of their students' future educational plans. However, this varied widely by instructor. When such information was available, it generally involved a favorable inclination to continue in school.

l. The Regular Leeward developmental program in language arts would appear to be the least expensive to operate.

Recommendations

a. Primary emphasis at Leeward Community College should be directed at working with developmental students having at least a high school reading ability. The data would tend to indicate that they made the greatest gains and that most were capable of doing college-level work after a semester of ENG 001.

b. Greater scrutiny should be given to the contention that an integrated skills approach will produce differential reading gains. The data in this study do not support this popular assumption.

c. Functional literacy does not appear to be a different concept than academic literacy. Survival skills are best attained by learning to read generic matter well.

d. Caution should be exercised in using the APL test. It does not appear to be as an effective instrument as some standardized measures which have been previously available.

e. Students having less than high-school-level reading abilities might best be served in programs which are truely "secondary" in nature. The institutions which offer programs with a clear secondary orientation are off-campus centers and the Department of Education.

f. Additional research is needed to study the impact of an integrated skills approach. A program which meets all of the characteristics of a comprehensive integrated skills approach should be studied. Further research to assess the possible long-range effects of all developmental education programs should be undertaken.

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